

Germantown Town Center

Transportation Staging Analysis

Montgomery County, Maryland

Prepared By:

Montgomery County Planning Board

The Maryland-National Capital Park and Planning Commission

February 1992

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I. INTRODUCTION

The Germantown Town Center is a Town Center Policy Area wholly surrounded by the Germantown West Policy Area in northern Montgomery County. The Town Center is one-half square mile in area, and currently contains 2,100 workers and 9 houses. Development approval has been given for an additional 2,800 jobs and 100 housing units. At buildout of the Master Plan, the area is expected to have over 9,600 workers and 1,900 residences. Montgomery County and Germantown West are shown in MAPS 1 & 2 respectively.

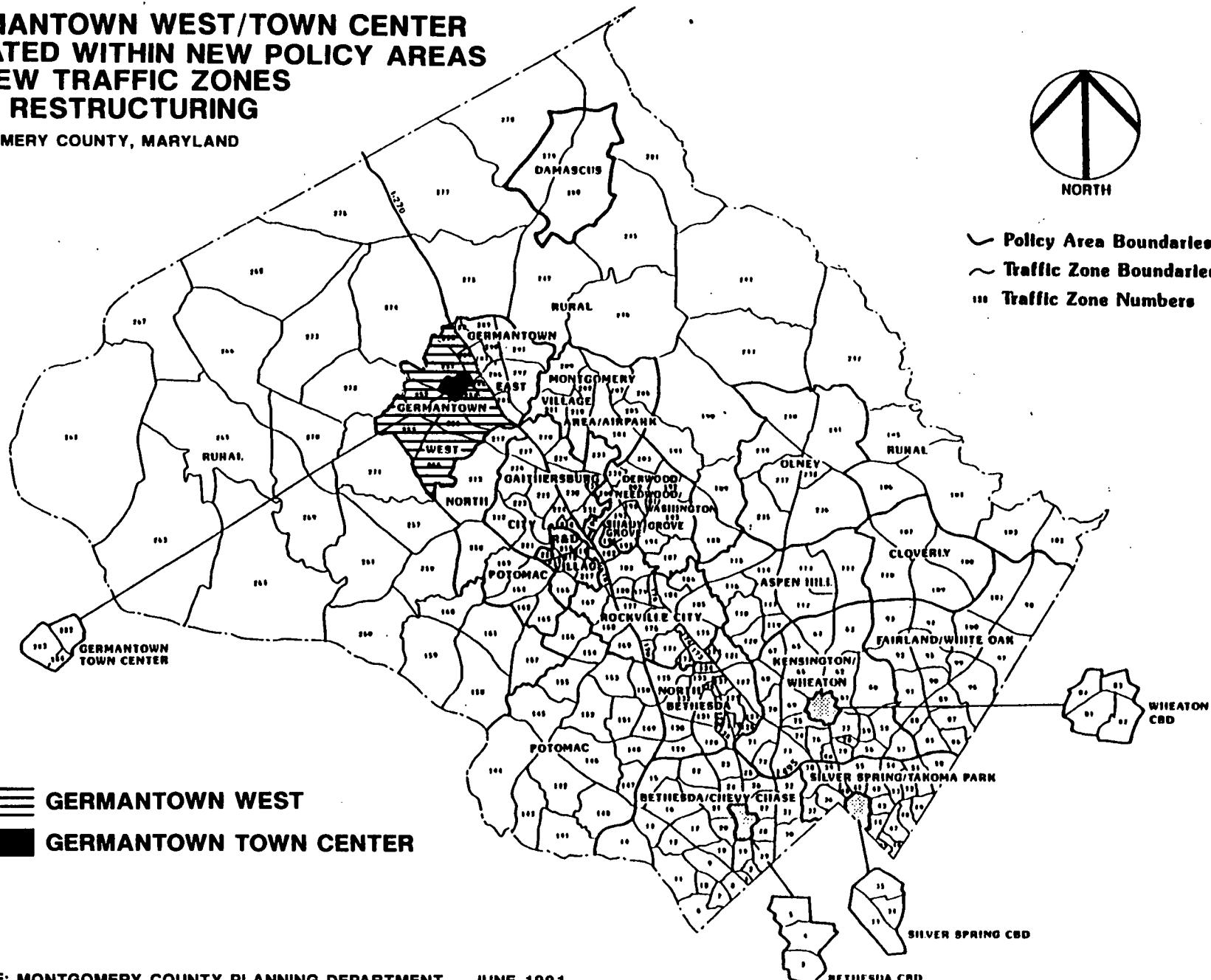
A design study has been recently completed and approved by the Planning Board. Significant elements of the Study are being drafted as an amendment to the Germantown Master Plan. The Design Study recommends a number of improvements to the Town Center area in order to create a more vital pedestrian-oriented community center. As with all development in the County, the Town Center will have to meet the requirements of the Adequate Public Facilities Ordinance. This report presents the results of a study of the staging of transportation facilities and programs that need to be provided to ensure that the transportation level of service remains adequate for the residents and workers of the Town Center and Germantown West policy areas.

In the adoption of the FY 92 Annual Growth Policy (AGP) (Resolution 12-275), the County Council directed the Planning Board to conduct a follow-up analysis of the newly-created Germantown Town Center Policy Area. The primary objective of this analysis was to determine what improvements to the transportation system, or changes in policy related to the AGP, would provide enough transportation staging ceiling capacity to permit full development of the Germantown Town Center with acceptable local congestion levels. Additionally, the Planning Board was asked to cooperate with the Executive who was to develop funding mechanisms for implementation of the necessary transportation improvements. Staff has been working with the Office of Planning Policy (OPP) and others in reviewing potential funding programs. Staff believes that the improvements recommended could be funded by several of the mechanisms being considered. Specifically, the FY 92 AGP Resolution states:

- "(a) The Planning Board should take the lead, with the aid of the Executive, in identifying changes to the Annual Growth Policy which would increase staging ceiling capacity in the Germantown Town Center. The measures to be analyzed include adjustments to policy area level of service standards and new transportation projects and programs.
- (b) The Planning Board should also take the lead, with the aid of the Executive, in conducting a Local Area Transportation Review (LATR) analysis, including possible change to LATR standards for the Town Center and immediate vicinity for the build-out time frame to assure that the area can accommodate the planned development without causing unacceptable level of congestion.

GERMANTOWN WEST/TOWN CENTER LOCATED WITHIN NEW POLICY AREAS BY NEW TRAFFIC ZONES WITH RESTRUCTURING

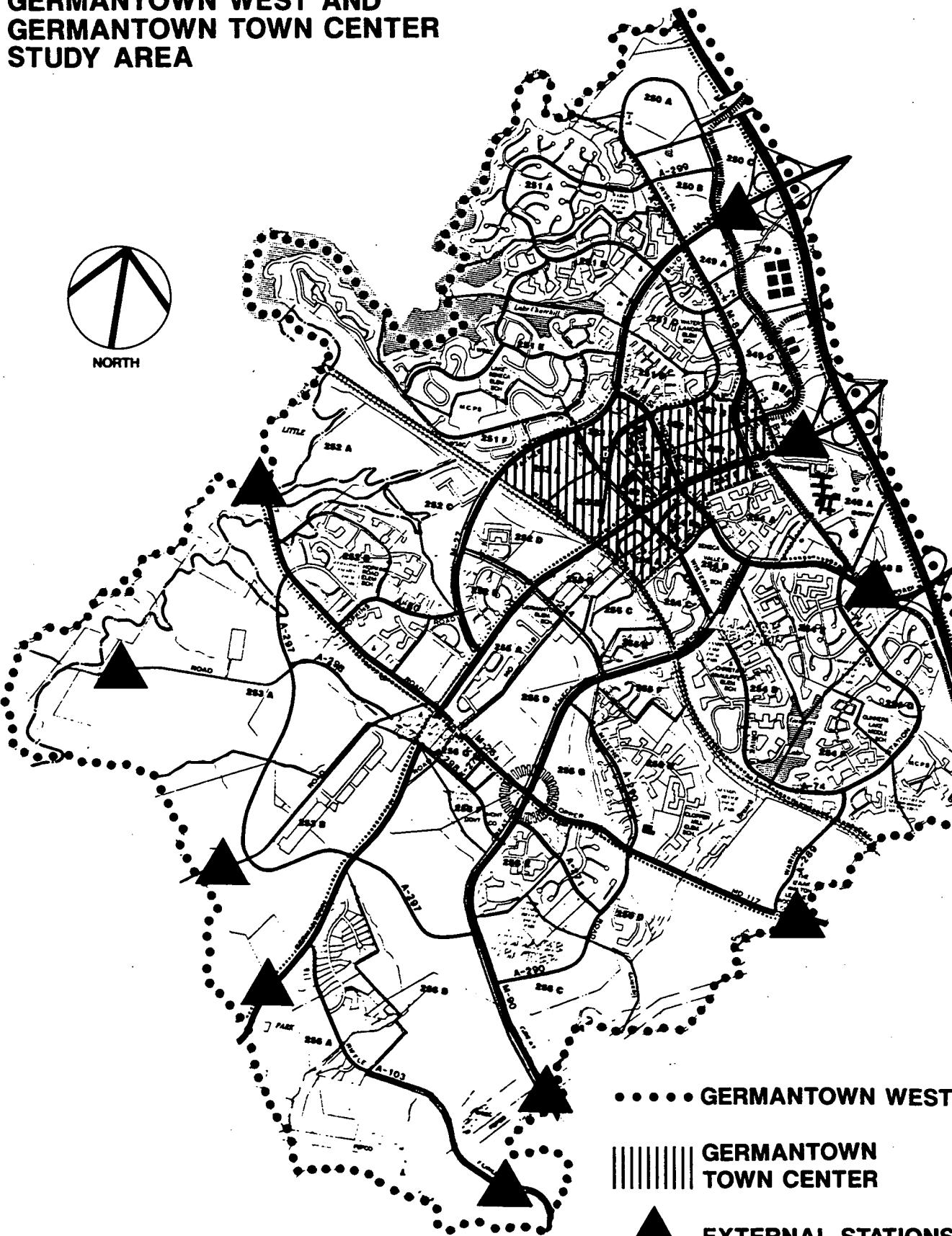
MONTGOMERY COUNTY, MARYLAND



GERMANTOWN WEST AND
GERMANTOWN TOWN CENTER
STUDY AREA



NORTH



- (c) *The Executive should take the lead, with the aid of the Planning Board, in developing the appropriate institutional, legal, and funding mechanisms (e.g. transportation management association or district, Share-A-Ride district, development district, neighborhood protection program) necessary to implement transportation facilities and programs that would add staging capacity for the Germantown Town Center, including the specific measures identified by the Planning Board as part of its transportation analysis under paragraph (b) [and (a)].*
- (d) *The transportation analysis, any proposed changes to the AGP, and any legislation implementing the institutional and funding mechanisms should be presented to the Council as soon as possible, but no later than January 1, 1992 (unless direction at the quarterly report is otherwise) to allow for an amendment to the FY 92 AGP or inclusion in the FY 93 AGP, as appropriate."*

In response to the Council directive in paragraphs (a) and (b) above, staff has analyzed policy choices and their implications for the Germantown Town Center. With regard to the work program scheduling of paragraph (d) above, at the July 1991 Quarterly Report of the Planning Board's Work Program with the County Council, it was agreed that this work should be completed by the end of January, 1992. This document contains staff's recommendations for providing transportation staging ceiling capacity and meeting Local Area Transportation Review standards for the Town Center.

II. SUMMARY OF RECOMMENDATIONS

Staff has reviewed two basic alternatives for enabling the Germantown Town Center to meet the Adequate Public Facilities Ordinance requirements. The first alternative, "Policy Adjustment," would change the way in which transportation facilities are judged to be adequate under the APFO. The second alternative, "Transportation Infrastructure," identifies facilities that would enable further development in the Town Center and Germantown West to proceed under current policies. Staff recommends the second alternative.

The "Policy Adjustment" alternative has implications that would necessarily go beyond the Germantown Town Center and Germantown West with regards to uniform application of policy. Additional staff resources would be required to evaluate the consequences of such a decision. In particular, any Policy Area Transportation Review (PATR) adjustment would affect transportation staging ceilings in other areas of the County. Changes in Local Area Transportation Review (LATR) standards or measurement systems would also impact other areas of the County. A discussion of possible policy changes is contained in Section III.

The recommended alternative, "Transportation Infrastructure," has a number of components, which are discussed in more depth in Section III of this report. The roadway and intersection improvements would allocate transportation staging ceiling to the Germantown Town Center and enable the Town Center development to meet Local Area Transportation Review standards. In addition, it would bring the Germantown West to a net remaining capacity of zero jobs and housing. The other transportation improvements, if all are implemented, would:

- 1) create a successful Transportation Management District
- 2) change Germantown West from a Group II to a Group III Policy Area,
- 3) free up new transportation staging ceiling capacity in the Germantown West Policy Area to enable planned development there to proceed.

One key constraint on the amount of additional development that could be permitted is the impact which traffic from that development would have on adjoining policy areas. This is particularly significant because the adjoining policy areas of Germantown East, Gaithersburg City, and North Potomac are currently in moratorium for new subdivision approvals for Jobs, Housing, or both. A second constraint is the background condition assumed when the decision is made. This analysis assumes built and approved development and the fully-funded four-year CIP network, including those roads fully funded by approved development as background. This report does not discuss financing mechanisms, which are still under study.

The recommended transportation improvements are listed below in six categories of Road Network, Intersection Improvements, Transit Service, Pedestrian and Bicycle Access, Vehicle Parking, and Transportation Management District. The roadway and intersection improvements would need to be fully programmed in the first four years of the Capital Improvements Program before transportation staging ceiling capacity could be allocated under current AGP rules. The transit service, those portions of the pedestrian/bicycle network on existing or programmed roads, and vehicle parking would need to be programmed before Germantown West could be classified as a Group III area. Similarly, the Transportation Management District would need to be operating and successful before such a change in Group could be made.

A. Road Network

1. Construct Relocated Darnestown-Germantown Road (MD 118) from Wisteria Drive to west of Clopper Road (MD 117) as a six-lane divided facility, with associated intersection, sidewalk, and bicycle path improvements.
2. Widen Clopper Road (MD 117) from north of MD 118 Relocated to south of Great Seneca Highway to a six-lane divided facility, with associated intersection, sidewalk, and bicycle path improvements.
3. Widen Middlebrook Road from MD 118 to Great Seneca Highway to a six-lane divided facility, with associated intersection, sidewalk, and bicycle path improvements.

B. Intersection Improvements

1. Improve the intersection of Great Seneca Highway at Wisteria Drive.
2. Improve the intersection of Crystal Rock Drive at Wisteria Drive.

C. Transit Service

1. Decrease headways on MARC to ten minutes in the peak direction during both the morning and evening peak periods and add a reverse direction train with no greater than 30-minute headways. Also, bi-directional mid-day and evening service on no greater than 30-minute headway needs to be provided.
2. Add four Ride-On routes connecting approved, but mostly unbuilt developments in Clopper, Kingsview, Neelsville, and Middlebrook Villages with the Town Center and MARC station. The Ride-On routes would be coordinated with MARC service. It is expected that existing Ride-On service would be maintained, with operational adjustments to better serve the residents of Germantown as the area's development actually occurs.

3. Implement a transit shuttle, with ten-minute headways throughout the day and evening, connecting the Germantown Campus of Montgomery College, the Town Center, and the MARC station. The transit shuttle would be coordinated with MARC service.

D. Pedestrian/Bicycle Access

1. Build key links in the sidewalk network throughout Germantown West, as shown in MAP 3, consistent with the Germantown Master Plan. An inventory of current sidewalk locations is shown in MAP 4.
2. Build the bicycle network, as shown in MAP 5, consistent with the Germantown Master Plan and Master Plan of Bikeways, including the proposed additions and modifications from the Town Center Design Study.

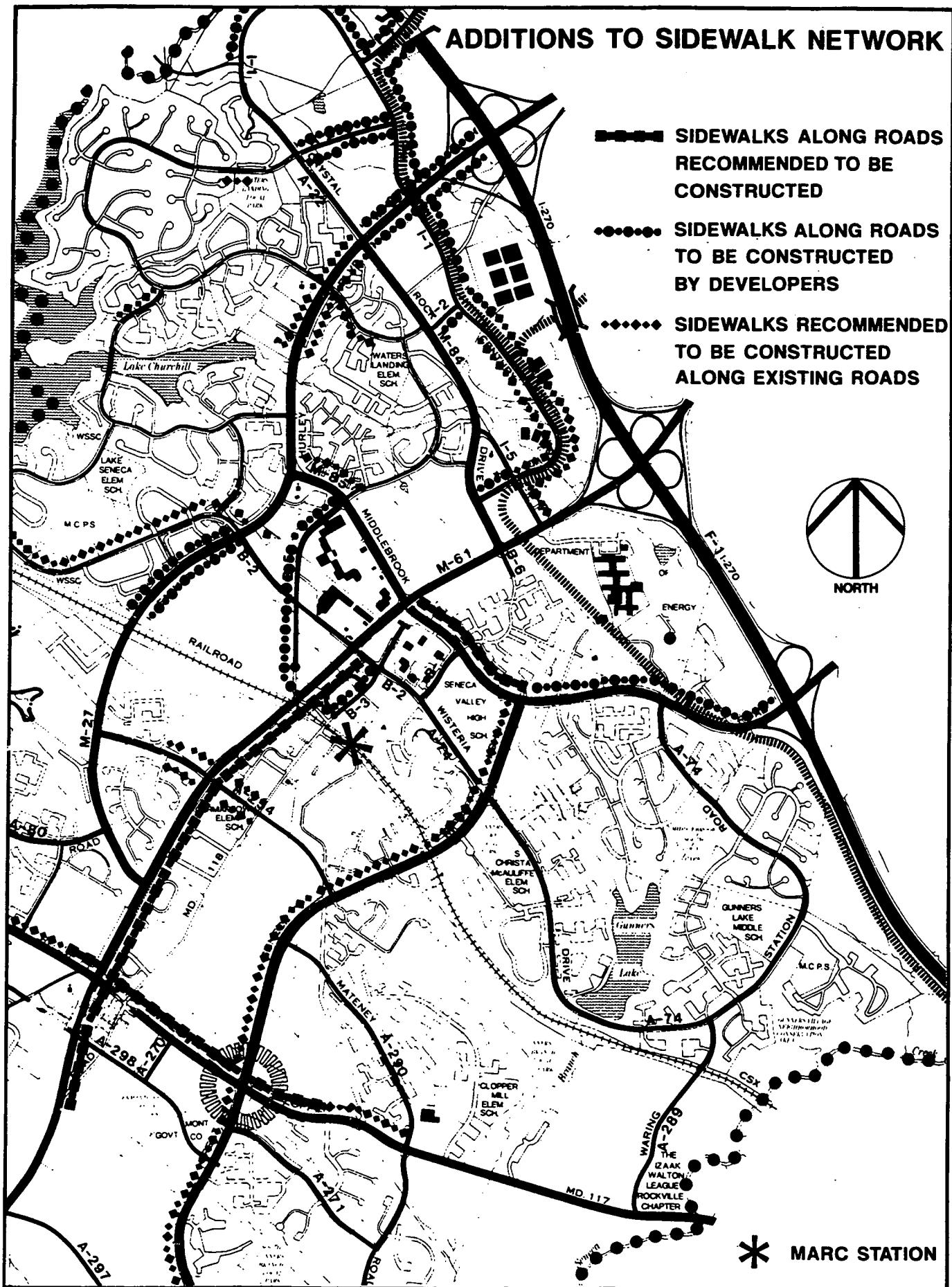
E. Vehicle Parking

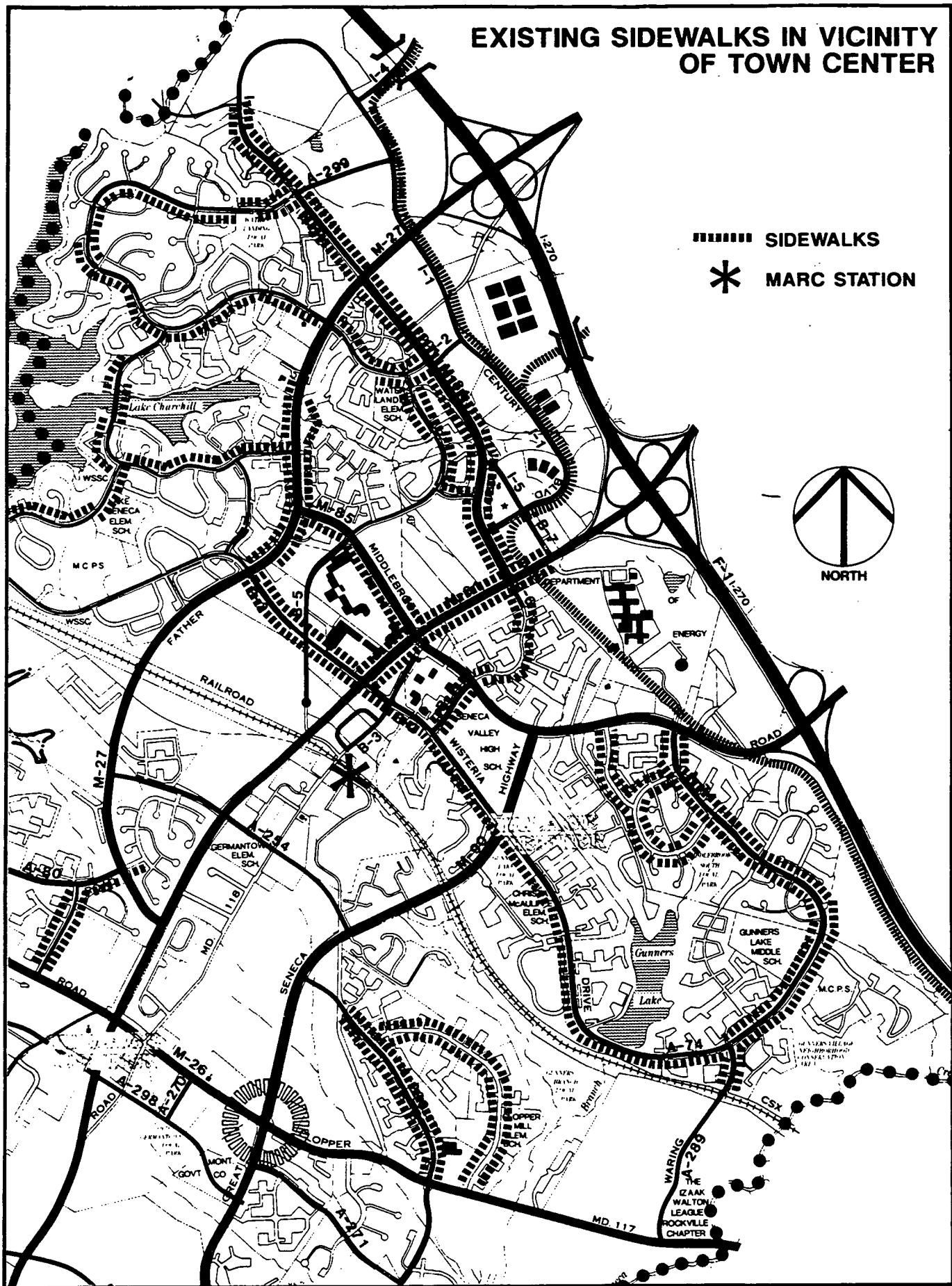
1. Construct an 800-space automobile parking garage at the Germantown MARC station.
2. Install at least 50 bicycle parking lockers at the Germantown MARC station or build and operate a guarded bicycle parking check room.

F. Transportation Management District

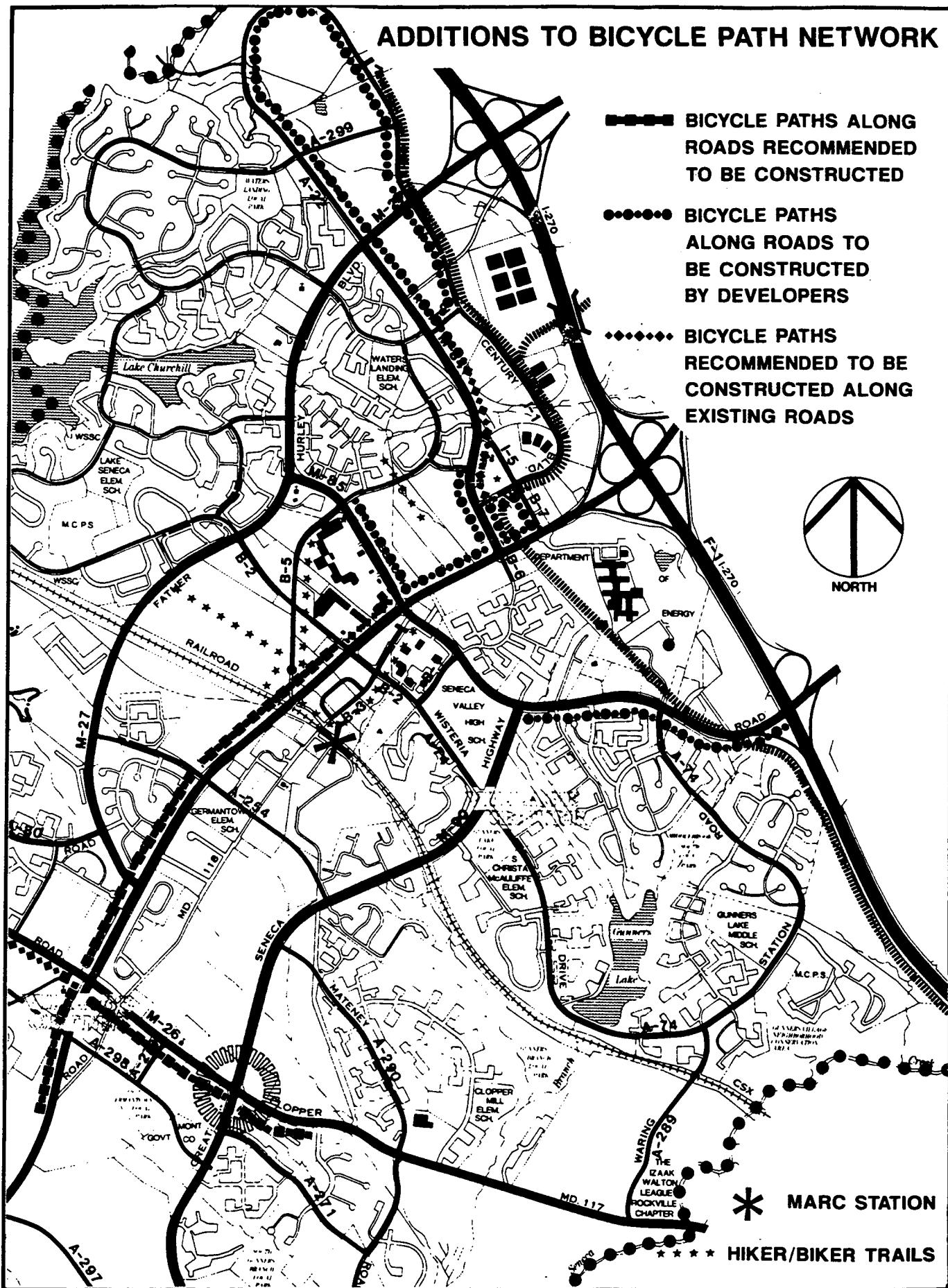
1. Create a Transportation Management District for both existing and future development in Germantown West. This organization would be responsible for coordinating ridesharing, providing commuter information, encouraging flexible work schedules, telecommuting, transit, walking, and bicycling, and collecting and analyzing transportation data on trip generation, travel behavior, traffic counts, transit ridership, and program effectiveness. We recommend that this organization have an independent funding source, either from the proposed development district, or from taxes and parking revenues generated in the Germantown West Policy Area. There is also the possibility of using County general revenues, which could be supplemented by State and Federal funds under the Clean Air Act Amendments of 1990 and/or the Intermodal Surface Transportation Efficiency Act of 1991.
2. Consider requiring all employers in the Germantown West area to have equal commuter subsidies for all modes of travel. Free parking, if offered, would be matched by a transit subsidy or cash award to employees who walk, bike, or do not work or park on site.

MAP 3



EXISTING SIDEWALKS IN VICINITY
OF TOWN CENTER

MAP 5



3. Require new development in the area to meet a specific traffic mitigation goal. Meeting this goal is necessary to achieve the anticipated Germantown Master Plan mode shares. Not reaching the mode shares by the time of development build out is expected to result in inadequate public facilities in the Germantown West Policy Area. The goal would need to be achieved in two phases, the first associated with Germantown West becoming a Group III policy area, the second associated with the Corridor Cities transitway. This traffic mitigation goal should be administered so that the Transportation Management District would have to meet that target collectively.

TABLE 1 presents a summary of the initial cost estimates for these various transportation improvements. It is expected that the cost estimates will be refined as part of the development of each of these projects. The means for funding is not addressed in this report and these cost estimates are for planning and informational purposes only.

TABLE 1: ESTIMATED COSTS OF TRANSPORTATION IMPROVEMENTS

PROJECT	CAPITAL COST	ANNUAL OPERATING COST	ESTIMATED BY
A. ROAD NETWORK			
MD 118 RELOCATED*	\$19,000,000		CIP
MD 117	\$ 4,900,000		OPP
MIDDLEBROOK ROAD	\$ 600,000		CIP
B. INTERSECTION IMPROVEMENTS			
CRYSTAL ROCK @ WISTERIA	\$ 200,000		MCPD
WISTERIA @ G.S.H	\$ 200,000		MCPD
SUBTOTAL:	\$24,900,000		
C. TRANSIT SERVICE			
MARC**			
RIDE-ON & SHUTTLE	\$ 3,850,000	\$ 1,100,000	MCDOT
D. PEDESTRIAN & BICYCLE NETWORK IMPROVEMENTS			
SIDEWALKS***	\$ 1,800,000		MCDOT
TRAILS & BIKEWAYS***	\$ 500,000		MCPD
E. VEHICLE PARKING			
MARC PARKING GARAGE**			MCDOT
BICYCLE LOCKERS	\$ 25,000		MCPD
F. TRANSPORTATION MANAGEMENT DISTRICT			
ANNUAL OPERATING COST		\$ 1,000,000	MCPD
SUBTOTAL:	\$ 6,175,000	\$ 2,100,000	
TOTAL:	\$31,075,000	\$ 2,100,000	

* MD 118 Relocated is partially funded by developer participation.

** Funding for MARC service and parking is expected to come from the Federal Intermodal Surface Transportation Efficiency Act of 1991.

*** Funding for Pedestrian and Bicycle Network improvements may be associated with road network improvements.

III. DISCUSSION

A. Transportation Analysis Procedures

In order to carry out this comprehensive transportation review for determining both staging ceiling and local area improvements, it was first necessary to develop a new analysis tool. This analysis tool has been given the name **SLATE**, an acronym of System for Local Area Traffic Estimation. The Technical Appendix in this report presents a brief summary of the methodology for performing Comprehensive Local Area Transportation Review studies utilizing a combination of the TRAVEL 2 model system, and current LATR procedures, with this System for Local Area Traffic Estimation (SLATE). The first application of SLATE is in the Germantown Town Center and Germantown West Policy Areas. For a detailed discussion of the TRAVEL 2 model see TRAVEL 2: Technical Documentation, and for current LATR procedures see Local Area Transportation Review Guidelines. These documents are available from the Transportation Planning Division.

This analysis examined and identified necessary transportation projects that would provide staging ceiling capacity in the Germantown Town Center as well as assist in LATR for intersections that would be affected by that increased development. It also evaluates impacts of potential road and development packages such as might be proposed by the Germantown West Road Club, or by a Development District. It is anticipated that this methodology will later be adapted for a similar analysis of development staging infrastructure and transit service requirements in the North Bethesda Policy Area. In addition, the Shady Grove Metrorail Station/ development district will also be under study in the upcoming year.

B. Development of Alternatives

Staff was directed by the Council to study various alternatives, which have been grouped for purposes of discussion into two basic alternatives:

- 1) changing policies, and
- 2) providing transportation infrastructure and services.

After discussion with the Legal Department, Planning Department staff believes that any policy adjustments would need to be applied uniformly through the County, which would have impacts beyond the Town Center. As a result, staff has spent the most time analyzing the second alternative of providing transportation infrastructure improvements. A number of the ideas presented below in this discussion of the Policy Adjustment Alternative may be worth considering for further investigation should there be a need to change current policies County-wide. However, this would require reviewing all the policy areas in connection with particular policy adjustments.

1. Policy Adjustment Alternative

Among the measures the County Council directed be studied in this report are adjustments to Policy Area Level of Service standards. There are a number of possible policy adjustments that could be made which could affect the measurement or application of Transportation Service Levels. Three such possible adjustments are discussed below:

- a) change standards,
- b) refine measurement of congestion,
- c) further change the measurement of transit service and availability.

Some of these have been previously discussed with the Planning Board while developing the FY 92 AGP in the fall of 1990.

a. Change Standards

This alternative would change the Level of Service Standards, in order to increase the acceptable amount of area-wide traffic congestion for the same amount of transit service. There are several ways that this could be done, but in order to maintain uniformity, it would need to be applied to all policy area groups, or to all areas in a particular group, such as Group II areas.

For example, changing standards in Group II areas would affect the following policy areas, all of which are in moratorium for subdivision approval for either housing units or jobs, given the Planning Board recommended FY 93 staging ceilings:

GROUP II POLICY AREAS	<u>AVAILABLE STAGING CEILINGS</u>	
	HOUSING	JOBS
Cloverly	moratorium	moratorium
Damascus	moratorium	
Germantown East		moratorium
Germantown West	moratorium	moratorium
Germantown Town Center	moratorium	moratorium
Montgomery Village/Airpark	moratorium	moratorium
North Potomac	moratorium	moratorium
Olney	moratorium	moratorium
Research and Development Village		moratorium

It is also probable that standards for Local Area Transportation Review would have to be relaxed. Years of experience with administering the Adequate Public Facilities Ordinance has generally shown that when a policy area is reaching its area-wide level of service standard, particular subdivisions also have difficulty satisfying Local Area Transportation Review standards. This change would need to be done consistently for all policy areas.

b. Refine Measurement

This alternative would redefine the measurement of area-wide congestion levels but keep current standards. One possible means for doing this would change how roads classified as freeways are counted in measuring the area-wide congestion in a Policy Area. A second possible means involves measuring the congestion from a user perspective rather than for facilities in an area, which could also use delay as the basis of measurement rather than volume.

Currently, area-wide congestion is estimated by averaging the relative degree of congestion on each roadway link in the analysis network as weighted by the amount of travel on each link. The relative degree of congestion on each link is derived by comparing the volume of traffic on the link to the capacity of the link. In the current procedures, the volumes of traffic on each type of link (i.e., freeways, major highways, or arterials) are treated in the same fashion. There are some indications, from applying these particular volume-based measures to observed data, that freeways tend to be somewhat more congested than the other roadways in an area, although those differences are decreasing. However, the freeways also tend to provide higher speeds and seem to be the route of choice when compared to travel on non-freeway roadways, so perhaps the perception of congestion is a more equal one.

A measurement redefinition that could be considered would be to give differential weights to freeways compared to the other roadways. The differentials would account for the system of choice and provide for more equivalent speeds at the measured congestion levels. It would be expected that such a differential weighting would result in less measured congestion given the same traffic volumes. However, there are a number of issues that would need to be addressed before such a redefinition would be considered, including the effect on potential systems for high occupancy vehicles.

It is not clear what effect, if any, such a measurement redefinition would have on how the Local Area Transportation Reviews are carried out.

A second measurement redefinition that could be developed is to measure congestion from a user approach rather than on a facility basis. Staff has done some investigation of defining a new measure of congestion based upon delay to users of the transportation system. This measure, because it would track trips rather than measuring volumes on links, would inherently capture "upstream-downstream" effects. It would also allow the use of the transportation model to help in setting ceilings in smaller policy areas such as the Metrorail Station areas. The current definition of area-wide congestion cannot be used for small areas because of 1) the difficulty of using this measurement where all of the capacity constraints are at intersections, rather than links and 2) the relatively small number of links in Metrorail Station policy areas, limiting the ability to have a statistically viable average for the area.

A new measure, based upon delay to users, would measure the percent delay experienced by the average traveler originating in (or destined for) a given area. It would include delay experienced beyond the boundaries of the policy area. One formulation of this new measure is to compute the ratio of congested to uncongested travel times for each origin-destination pair. Such a particular measure would favor increasing housing in areas with high Job/Housing ratios and adding jobs in areas with low Job/Housing ratios. That is because such changes would shorten trip lengths and encourage trips to use the off-peak direction on the road network.

A delay-based approach to measuring intersection congestion, such as the Highway Capacity Manual Operational Method, could also change our current LATR procedures to a user-based approach. However, as noted previously before the Planning Board, delay calculations require more data or more assumptions than the current Critical Lane Volume measure of intersection congestion, giving less certainty in the answer. However, delay may give a better reflection of congestion as perceived by users. Changing the measurement system in this manner would inherently result in different standards.

c. Further Changes to the Measurement of Transit Service and Availability

In adopting the FY 92 AGP, the County Council instituted a refined approach which establishes quantitative relationships to measure transit service and availability. As initially discussed with the Planning Board in drafting the FY 92 AGP, there are further changes possible to the measurement of transit service and availability, resulting in changes to the current Level of Service Group classification system (shown in CHART 1 and MAP 6) . Those changes could have some applicability to this Germantown Town Center Transportation Staging Analysis.

Currently, a relatively large amount of improvement in transit service is needed to change the classification of the Policy Area Group for a particular policy area. For each change in group classification, a relatively large change in corresponding average highway level of service is identified, thus permitting a large increase in allowable congestion.

With a tight fiscal situation, this relationship could be adjusted to permit smaller increments in transit service to be associated with smaller increases in allowable highway congestion. The "Group" system would be replaced by a relationship that directly relates the overall transportation level of service in each area to the sum of three component elements, its transit level of service, its roadway level of service, and its pedestrian/bicycle level of service. The particular measures that would implement that concept would need to be agreed upon in order to implement this change in measurement. A single countywide Transportation Service Level would be directly maintained, as is the intent of the current system.

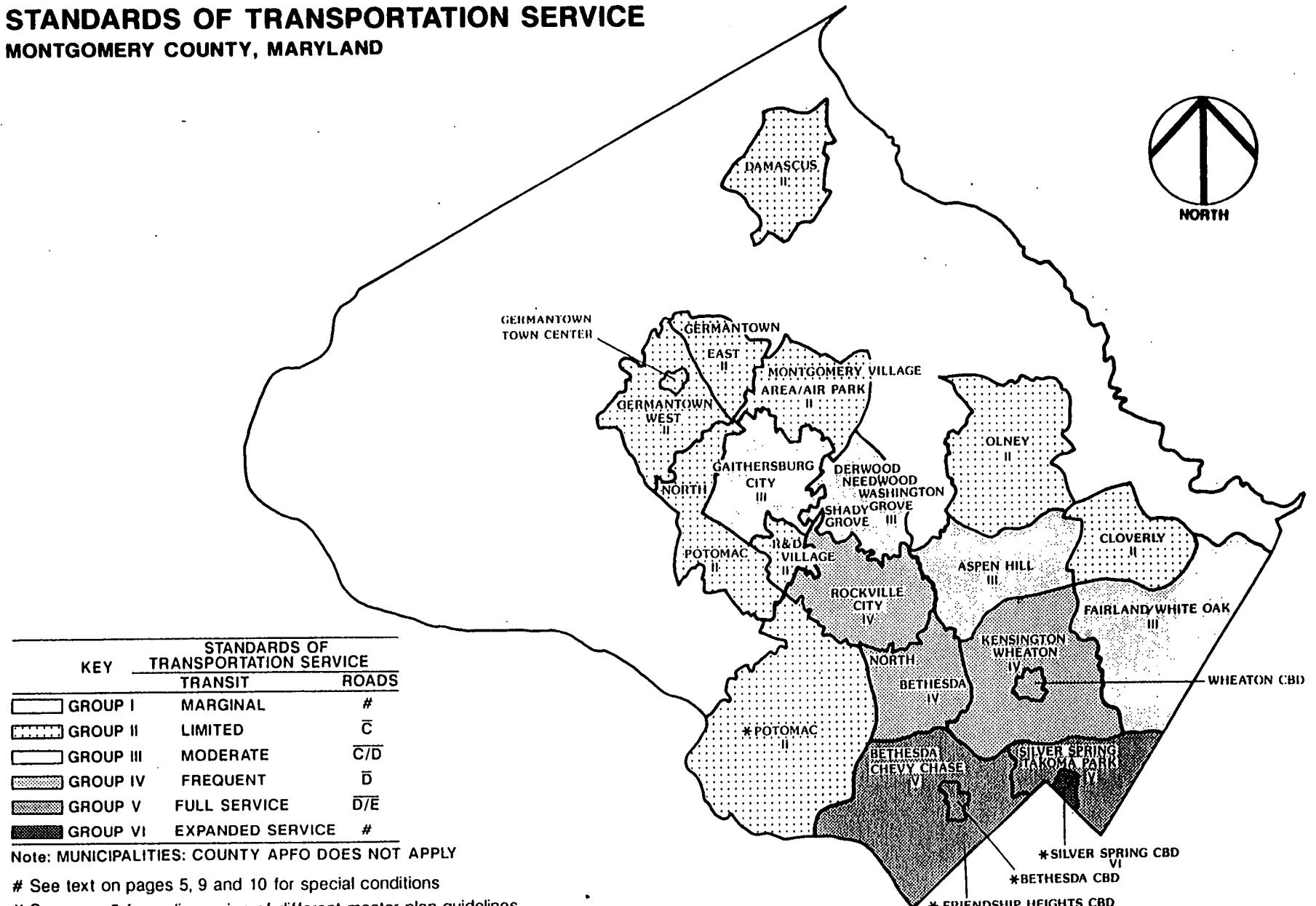
In summary, staff is not recommending the possible changes suggested above in the context of the Germantown Town Center Transportation Staging Analysis. The primary reason for recommending no change here is the uncertain impact such a change would have on other areas of the county. A more comprehensive study of countywide impacts of any desired policy change is needed before staff can recommend such a change.

STANDARDS OF TRANSPORTATION SERVICE

MONTGOMERY COUNTY, MARYLAND



NORTH



Source: Montgomery County Planning Department

CHART 1: QUANTIFYING THE CORRESPONDENCE BETWEEN TRANSIT AVAILABILITY AND AVERAGE LEVEL OF SERVICE STANDARDS

Average Roadway Level of Service Standards	Group Classifications	Public Transport Alternatives to Automobile Travel	Transit Services Available or Programmed					
			Auto Dependent System and/or Park/Ride Access		Bus Base Systems		Fixed Guideway Systems	
			Community and Local Bus Service	Regional Park/Ride Express Bus and High Occupancy Vehicle Priority Systems	Commuter Rail or Light Rail	Metrorail		
Representative Quantification Measures**								
			1. Number of Park/Ride Spaces Serving the Policy Area	2. Average Bus Frequencies in AM Peak Hour on Combined Routes (Buses per hour)	3. Number of Parking Spaces in Fringe Parking Lots	4. Average Frequency of Commuter Rail AM Peak Hour (Trains per hour)	5. Average Frequency of Metrorail in AM Peak Hour (Trains per hour)	
*	I	Marginal	Marginal access to stations or bus routes outside of the area	Not available	Not available	Marginal amount of the area is within walk access	Not available	
C	II	Limited	Limited number of park/ride spaces	Limited coverage and frequency	Limited park/ride spaces or lots with local bus service	Limited park/ride access and walk access	Park/ride and kiss/ride access limited to nearby stations outside of the area	
			100 to 500	2 to 3.5	100 to 500	3 to 6	0	
C/D	III	Moderate	Moderate number of park/ride spaces, limited kiss/ride service	Moderate coverage, service limited to policy frequencies	Moderate express bus service in conjunction with a system of park/ride lots	Moderate parking or walk access with system transfers	Moderate station coverage and train frequencies in the area with associated feeder access	
			500 to 1,000	3.5 to 5	500 to 2,250	6 or more	0 to 15	
D	IV	Frequent	Very good number of park/ride spaces and moderate kiss/ride service	Moderate coverage, combined policy and frequent demand-based service	Priority treatment for frequent express buses, local circulation feeder services in conjunction with a system of park/ride lots	Same as Group III above	More dense spacing of stations and bus routes, frequent train service	
			1,000 to 1,500	5 to 8	More than 2,250		15 to 35	
D/E	V	Full	Substantial park/ride with full reliance on kiss/ride access	Full area coverage and a large number of routes with frequencies based on demand	Same as Group IV above	Same as Group III above	Full frequency and full reliance on kiss/ride, easier walk and bicycle access	
			1,500 to 2,250	8 to 10			More than 35	
*	VI	Expanded	Expanded park/ride with reliance on kiss/ride access	Expanded bus frequencies, 100 buses on all routes in PM Peak Hour	Same as Group IV above	Same as Group III above	Full frequency, station in designated CBD with controlled parking and Transportation Mgmt. District	
							More than 35	

* See text of the adopted AGP for methods and standards of measuring traffic.

** Other measures also are used in quantifying level of service; see supporting documentation.

Source: Montgomery County Planning Department, June 1991.

2. Transportation System Improvements Alternative

The other broad alternative that Council directed staff to study was the provision of transportation infrastructure and services. These improvements can be divided into six major components: Roadway Network, Intersection Improvements, Transit Service, Pedestrian and Bicycle Access, Vehicle Parking, and Transportation Management District. Staff has examined many different combinations of infrastructure improvements in order to determine what facilities would be needed to a) provide staging ceiling under the current Group II level of service; b) change the level of service from Group II to Group III; and c) satisfy Local Area Transportation Review requirements.

The road Network Improvements identified below would provide sufficient staging ceiling at the current Group II designation to allow full development of the Germantown Town Center. The Roadway Network Improvements and the Intersection Improvements would be needed in order for these projects to pass Local Area Transportation Review.

The Transit Service, Pedestrian and Bicycle Access, Vehicle Parking, and Transportation Management District improvements would change the level of service from Group II to Group III. This change would also provide sufficient staging ceiling capacity to allow full development of the Town Center and potentially significant additional capacity for other properties in Germantown West. The upstream and downstream effects of additional Germantown West development on roads in neighboring policy areas would still need to be determined before a final recommendation on the amount of staging ceiling capacity that would be allocated. While it would be desirable to approve Town Center Development relying only upon transit and access related improvements, under current Local Area Transportation Review standards, all of the previously identified Roadway Network Improvements and Intersection Improvements would also have to be provided.

a. Roadway Network

Several Roadway Network Improvements are recommended for the allocation of staging ceiling to the Germantown Town Center developments.

- 1) Relocated Darnestown-Germantown Road (MD 118 Relocated) - This road serves traffic approaching the Town Center from the West. The project includes a new crossing of the MARC line, providing more flexibility in the overall use of the road network, and diverting some traffic from the crossing on Great

Seneca Highway. The current Old MD 118 crossing is a narrow and unsafe two lane bridge. Part of MD 118 Relocated serves as frontage to the Town Center development. Construction of MD 118 Relocated would also result in a new intersection with Clopper Road (MD 117). Several intersections along Old MD 118 and Great Seneca Highway are anticipated to have unacceptable local congestion levels without intersection improvements provided by the MD 118 Relocated and MD 117 projects. The MD 118 Relocated project and the MD 117 project, discussed below, are critically needed to provide LATR capacity in Germantown West.

It is expected that developer participation would help finance this road. MD 118 Relocated was deferred from the first four years of the Capital Improvements Program in 1990 after development had already been approved based on the staging ceiling capacity it provided.

MD 118 Relocated will have a Class I bicycle path on the north side and a sidewalk on the south side in accordance with the Master Plan and Town Center Design Study.

- 2) Clopper Road (MD 117) - This segment connects the intersection of MD 117 and MD 118 Relocated with the intersection of MD 117 and Great Seneca Highway. Improving this section prevents unacceptable intersection congestion at those two intersections, and would divert traffic which would otherwise use parallel roads including Middlebrook Road, Wisteria Drive, and A-254.

MD 117 will have a Class I bike path on the west side and sidewalk on the east side in accordance with the Germantown Master Plan. A 24-foot wide median will also be constructed and trees planted.

- 3) Middlebrook Road - A segment of Middlebrook Road from MD 118 to Great Seneca Highway is currently a five-lane undivided roadway. Staff recommends this be improved to a six-lane divided roadway. The intersection of Middlebrook Road and Great Seneca Highway will also be improved by this project.

Middlebrook road will be constructed with a sidewalk on the south side and a Class I bicycle path on the north side, and a 24-foot wide median with trees to improve safety and

aesthetics for motorist and non-motorist alike. There is currently a sidewalk along only one side of this segment, resulting in a gap in the pedestrian network.

b. Intersection Improvements

- 1) Great Seneca Highway at Wisteria Drive - This intersection will need to be improved to prevent unacceptable conditions and excessive delay at this location. Pedestrian crosswalks and pedestrian-controlled signals should also be provided. Exclusive right-turn lanes, resulting in the pedestrian crossing more than three lanes of traffic, should be accompanied by a pedestrian refuge island.
- 2) Crystal Rock Drive at Wisteria Drive - This intersection will need to be improved to prevent unacceptable conditions and excessive delay. Exclusive right turn lanes, resulting in the pedestrian crossing more than three lanes of traffic, should be accompanied by a pedestrian refuge island.

The locations where intersection improvements are needed are illustrated in MAPS 7 to 9.

MAP 7 shows the intersection LOS for the base plus pipeline of approved development with the FY 92 AGP transportation network, including the improvements required of approved developments.

MAP 8 shows the intersection LOS for the base plus pipeline of approved development plus the full buildout of the Germantown Town Center development, using the same network as MAP 4.

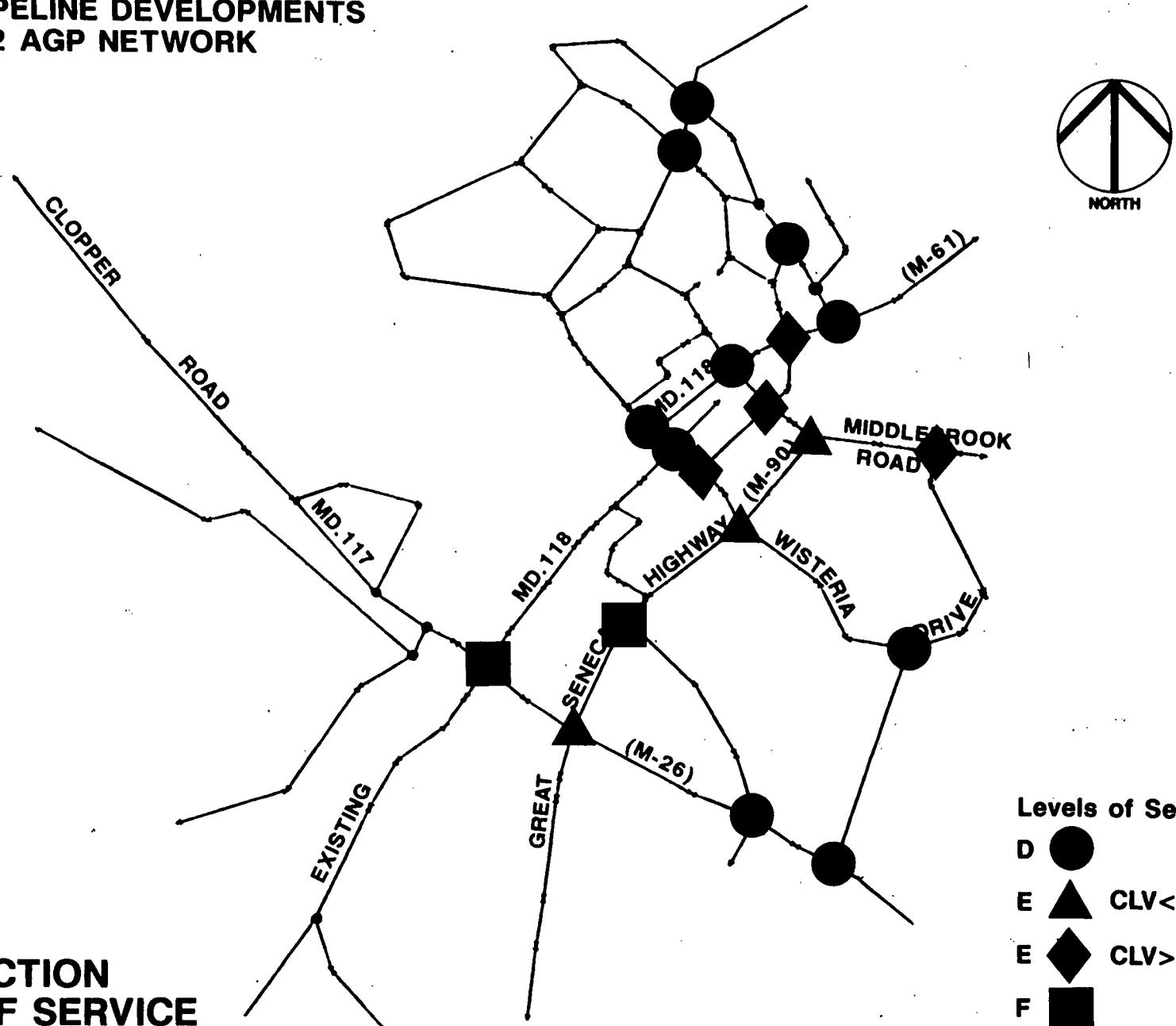
MAP 9 shows the intersection LOS for the base plus pipeline of approved development plus the full buildout of the Germantown Town Center, including the transportation improvements recommended in this report.

TABLE 2 shows intersection LOS for different land use and network patterns. The first column is 1990 base condition, the second approved development on the fully-funded, four-year CIP network. The third shows LOS for the Town Center without roadway or intersection improvements. The fourth shows LOS after construction of all roadway improvements.

**BASE + PIPELINE DEVELOPMENTS
WITH FY92 AGP NETWORK**

23

**INTERSECTION
LEVEL OF SERVICE**

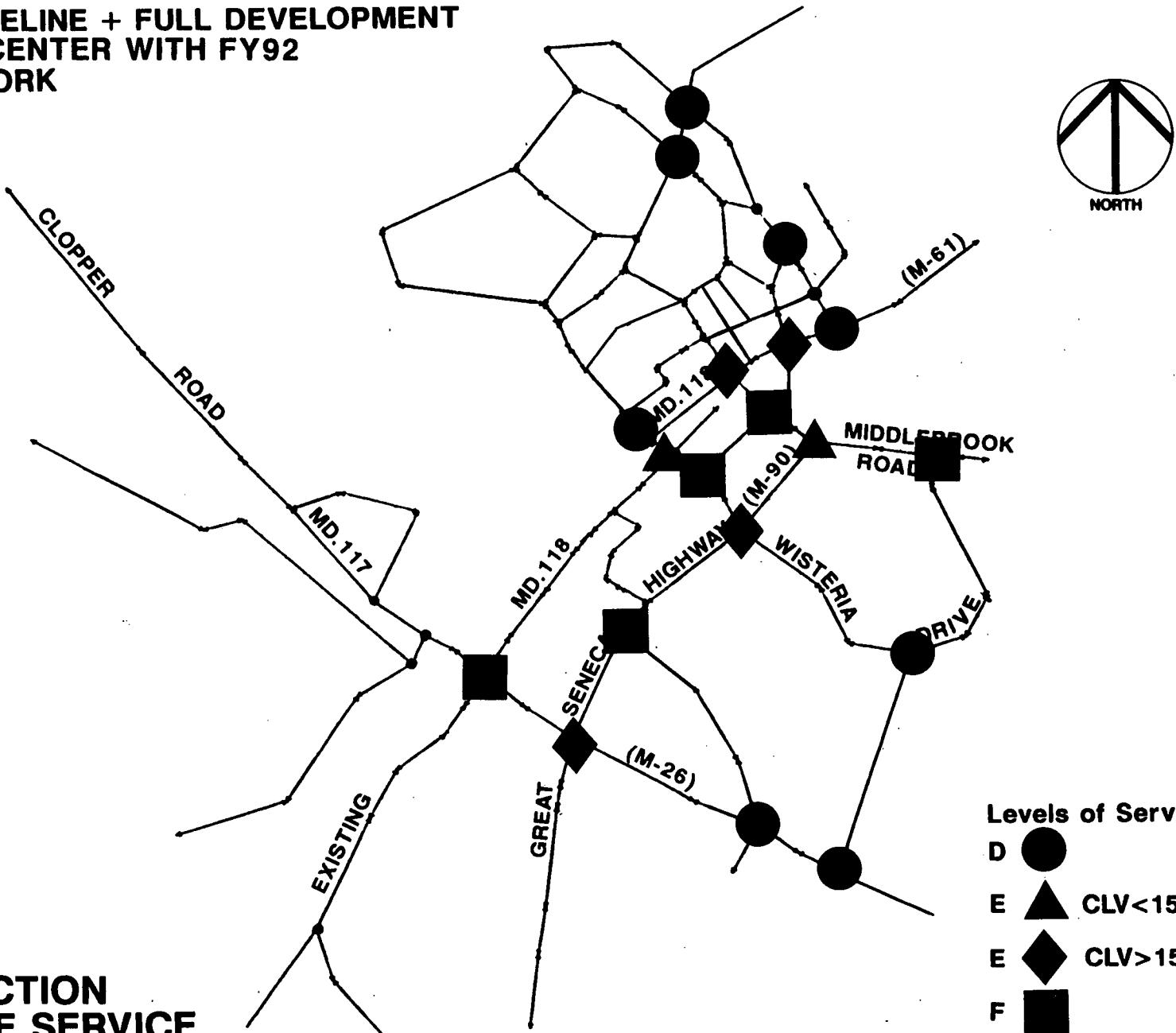


MAP 7

BASE + PIPELINE + FULL DEVELOPMENT
OF TOWN CENTER WITH FY92
AGP NETWORK

24

INTERSECTION
LEVEL OF SERVICE



**BASE + PIPELINE + FULL DEVELOPMENT
OF TOWN CENTER WITH FY92 AGP NETWORK
AND RECOMMENDED IMPROVEMENTS**

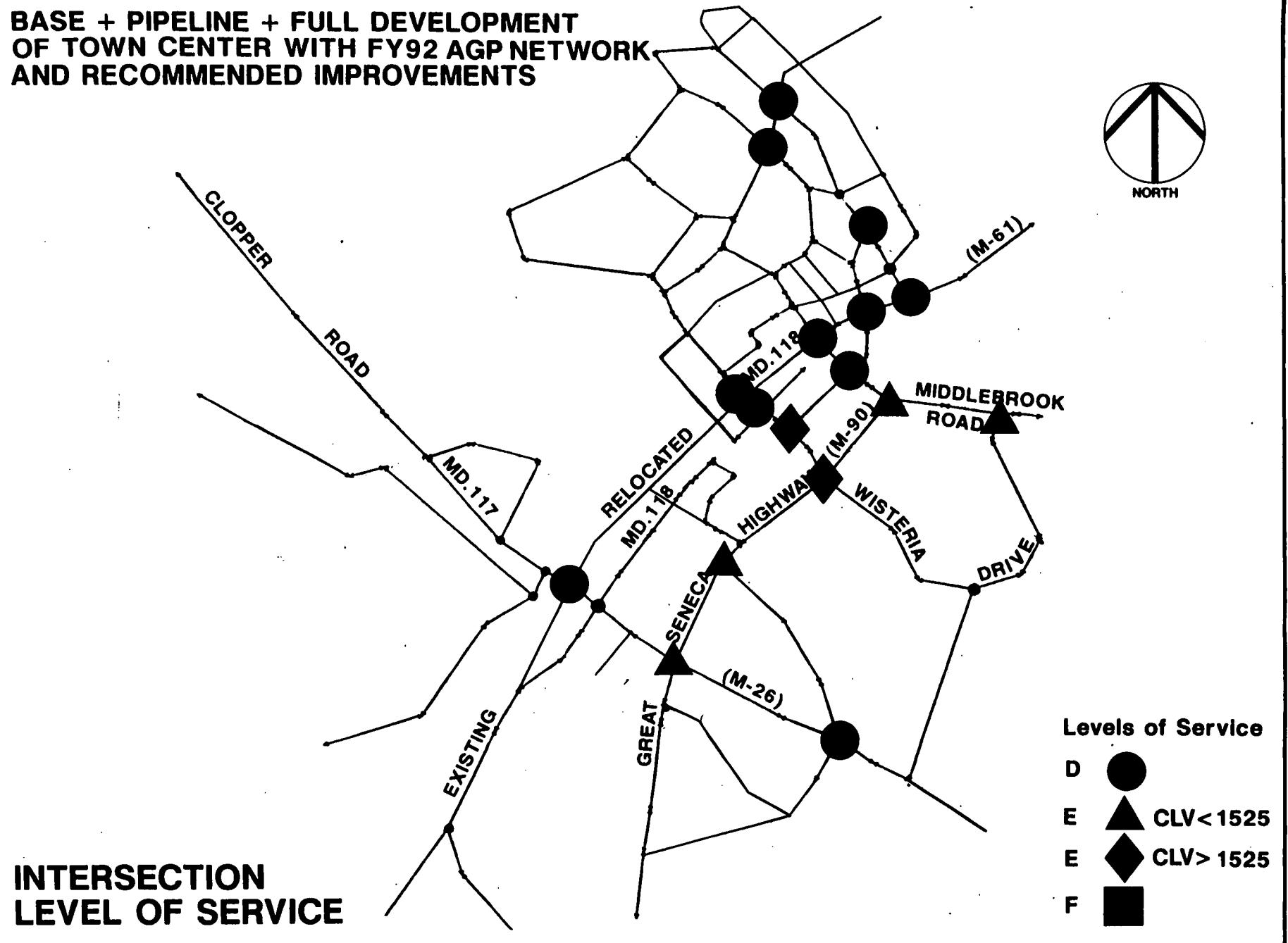


TABLE 2: SUMMARY OF INTERSECTION LOS (PM PEAK HOUR) ANALYSIS

Intersections	Existing (Base) ¹	Base + Pipeline Development with FY92 AGP Network	Base + Pipeline + Full Development of Town Center with FY92 AGP Network	Base + Pipeline + Full Development of Town Center with FY92 AGP Network and Recommended Improvements
MD 118/Aircraft Drive	E	D	D	D
MD 118/Crystal Rock Drive	C	E ²	E ²	D
MD 118/Middlebrook Road	C	D	E ²	D
MD 118 N./Wisteria Drive	A	D	D	D
MD 118 S./Wisteria Drive	A	D ²	E ²	D
Old MD 118/MD 117	E	F ²	F ²	C
Relocated MD 118/MD 117	-	-	-	D
MD 117/Waring Station Road	D	D	D	C
MD 117/Mateney Road	D	D	D ²	D
MD 117/Great Seneca Highway	E	E	E ²	E
Great Seneca Hwy./Mateney Road	-	F ²	F ²	E ^{2,3}
Great Seneca Hwy./Wisteria Drive	D	E	E ²	E ^{2,3}
Great Seneca Hwy./Middlebrook Road	C	E	E	E
Crystal Rock Drive/Wisteria Drive	-	E ²	F ²	E ^{2,3}
Crystal Rock Drive/Middlebrook Road	B	E ²	F ²	D
Crystal Rock Drive/Aircraft Drive	A	D	D	D
Crystal Rock Drive/Father Hurley Blvd.	A	D	D	D
Waters Landing Drive/Father Hurley Blvd.	A	D	D	D
Middlebrook Road/Waring Station Road	A	E ²	F ²	E
Wisteria Drive/Waring Station Road	B	D	D	C

M-NCPPC

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¹ Existing (Base) levels of service generally reflect 1990 traffic condition which is prior to opening the I-270/Middlebrook Road interchange.

² Intersections with unacceptable critical lane volumes exceeding 1,525.

³ With recommended intersection improvements, these intersections will operate at acceptable levels of service (critical lane volumes less than 1,525).

c. Transit Service Improvements

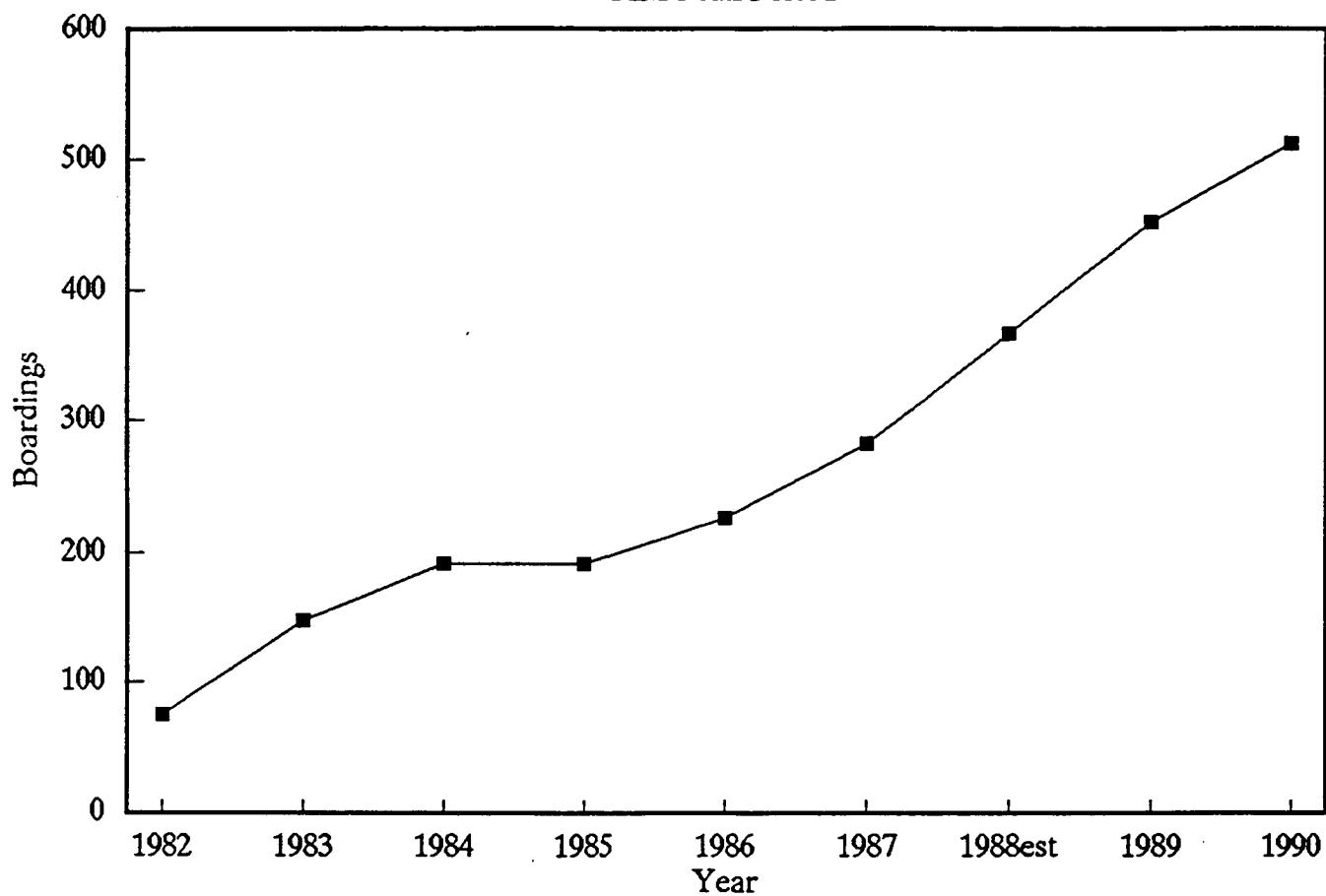
Staff is recommending several transit service improvements. It is hoped that by providing these services concurrently with new development in the Town Center and Germantown West, a better utilization of these services will occur. If new trips are formed with transit options available, they are more likely to use transit than if transit is added after trip-making behavior is established.

- 1) MARC - The MARC line in Germantown has experienced a significant increase in a.m. peak period boardings (see FIGURE 1). To encourage increased ridership on the already successful MARC service, staff is recommending that MARC service be increased to 10-minute headways in the peak direction trains, and 30-minute headways in the reverse direction for both the AM and PM peak periods. The increased train service would run from Brunswick to Union Station. This is a regional project, serving West Virginia, Frederick and Montgomery Counties in Maryland, and the District of Columbia. This increased service is necessary for Germantown West to become a Group III area.
- 2) Ride-On - Staff is recommending that four bus routes be provided connecting the MARC station and Town Center with the four outer villages of the Germantown Planning Area. The bus routes are not currently programmed or designed, but preliminary routing has been discussed with MCDOT. These routes would provide added mobility for people with disabilities and increase options for commuters in the following residential areas:

Clopper Village
Kingsview Village
Neelsville Village
Middlebrook Village.

This increased service is a necessary prerequisite to Germantown West becoming a Group III area.

FIGURE 1: Boardings at Germantown MARC Station
AM Peak Period



source: MARC

- 3) Town Center Transit Route - The Town Center Design Study calls for a Transit Route connecting the Transit Easement Station with the MARC station. Staff is recommending that this initially be implemented as a transit shuttle operating at ten minute headways in the peak and off-peak connecting Montgomery College, the Town Center, and the MARC station instead. By providing this service, mobility is increased for Montgomery College students, who tend to have fewer transportation choices than the population at large. This increased service is necessary for Germantown to become a Group III area.

d. Pedestrian and Bicycle Network

The following three sets of improvements are necessary for Germantown to become a Group III area:

- 1) Sidewalks - There are several areas where additional sidewalks are needed. As indicated in MAP 2, which shows existing sidewalks in the vicinity of the Town Center, there are discontinuities in the pedestrian network which need to be eliminated. Additional connections are also needed to improve pedestrian accessibility to the MARC station and to bus stops within the Germantown West area. These additions will allow the Town Center to become more pedestrian oriented.

Staff recommends that the approximately 12 miles of additional sidewalks depicted on MAP 1 be constructed. Those elements on the existing roadway system would need to be constructed or funded before Germantown West could be reclassified. These sidewalks are consistent with those recommended in the 1989 Germantown Master Plan and the Germantown Town Center Design Study. In addition, along existing MD 118 between Clopper Road (MD 117) and the CSX Railroad Tracks, a sidewalk should be constructed along the south side of the roadway. That will facilitate pedestrian access to the MARC station and to the Germantown Elementary School. Further, the feasibility of a direct pedestrian connection from the MARC station to Analysis Area TC-5 along the eastern edge of the tracks under MD 118 Relocated should be evaluated.

2) Trails - The Germantown Town Center Design Study recommends the construction of four additional hiker/biker trails within the Town Center. These trails will complement the pedestrian and bicycle networks.

Staff recommends that these trails be provided:

- o Locbury Drive/Waters Road (south and east side) and connection to Father Hurley Boulevard
- o Old MD 118/Walter Johnson Drive (south side)
- o Wisteria Drive (south side)
- o Town Center Park and connection to hiker/biker trail system in Churchill Village

3) Bicycle Routes - Additional bicycle paths are needed in Germantown West and the Town Center. While bicycles are currently used primarily by those under 18 for transportation and by adults for recreation, the provision of safe, exclusive bicycle paths can increase the use of this mode of travel for commuting and transit access. In particular, access to the MARC station and to employment opportunities needs to be established.

Staff recommends that bicycle paths shown on MAP 3 be constructed as exclusive, Class I, facilities. Those elements not sharing right-of-way with unbuilt and unfunded road projects would need to be funded or built before Germantown West could be reclassified. In addition to these connections which are included in the 1989 Germantown Master Plan, staff recommends that the feasibility of constructing a bicycle path between Century Boulevard and Observation Drive parallel to the Transit Easement's crossing of I-270 should be evaluated.

e. Vehicle Parking at the Germantown MARC station

1) Automobile - Staff is recommending expansion of the successful Park and Ride Lot at the Germantown MARC station to 800 spaces. This is a condition of Germantown West becoming a Group III area.

- 2) **Bicycle** - There are currently no secure bicycle lockers at the Germantown MARC station. In order for bicycle commuting to be more successful, the bicycle paths should terminate at a location with secure bicycle parking. Staff recommends that 50 secure bicycle lockers, or a guarded bicycle check room be provided at the station.

f. Transportation Management District

- 1) The creation of a Transportation Management District, and its subsequent success in increasing non-driver mode share, is a necessary prerequisite for Germantown West to become a Group III policy area. This organization would be funded by a development district, taxes, fees, parking charges, or some other assured revenue source. There is also the possibility of using County general revenues, which could be supplemented by State and Federal funds under the Clean Air Act Amendments of 1990 and/or the Intermodal Surface Transportation Efficiency Act of 1991. The organization would have several primary functions:
 - succeeding existing privately sponsored ridesharing programs and providing a personalized ride-matching service in Germantown,
 - assisting commuters in obtaining transportation information, including the selling of transit passes and parking permits, and
 - collecting and analyzing transportation data, including conducting trip generation, trip purpose, trip length, mode usage, trip peaking, traffic operations, and traffic volumes studies in Germantown West that document the effectiveness of the programs of the District.
- 2) As part of the TMD, it would be important to consider requiring or encouraging the equalization of commuter subsidies by employers for their workers within the Germantown West TMD. Under such a program, existing and future employers would be required or encouraged to monetize the value of the parking provided as an employee benefit, offering those who do not use this parking the option of receiving this subsidy to help cover the costs of telecommuting, transit or ridesharing, or as added income if they walk or bicycle to work. Financial incentives could be offered to those employers who implement such an

equalization of commuter subsidies, with appropriate financial disincentives for those not willing to implement such a program.

- 3) Development located within the Germantown West and Germantown Town Center Policy Areas would be expected to meet specific traffic mitigation goals. It is expected that these goals would be implemented in two phases. The first, related to the success of the TMD, would result in making Germantown West a Group III area. The second would be coordinated with the implementation and success of the Corridor Cities transitway. Achieving these goals is necessary to reach anticipated Master Plan levels of transit use and ride-sharing. Failure to achieve those mode shares would result in inadequate transportation facilities.

The Traffic Mitigation Goal that staff recommends is similar to that outlined in the AGP for areas requiring traffic mitigation, such as loophole properties. The first phase goal might state:

"The portion of peak period nondriver work trips arriving at or leaving development located within the proposed Transportation Management District must be at least 60% greater than the prevailing nondriver work trip mode share of comparable nearby land use."

This rule could be applied to a development district in order to reach the anticipated master plan mode share for work trips. The prevailing nondriver mode share initially could be held to be the most recently available observed data, with a base year of 1987, and would be updated with the data collection by the TMD. It is expected that when the Corridor Cities Transitway is built, the goal would be strengthened to reach the ultimate Master Plan expectations of a higher nondriver mode share.

In conclusion, staff is recommending six categories of transportation infrastructure or services that should be built or implemented to serve the Germantown Town Center. The first category, roadway network improvements, is necessary to provide sufficient staging ceiling capacity at the current Group II designation to allow full development of the Germantown Town Center. These roadway network improvements, and the second category of intersection improvements, will be needed in order for development in the Town Center to satisfy Local Area Transportation Review standards.

The next four, transit service improvements, pedestrian and bicycle network construction, provision of vehicle parking, and a successfully operating Transportation Management District, are necessary for Germantown West to be classified as a Group III area. With Germantown West as a Group III area, additional transportation staging ceiling capacity could be allocated to the Germantown West Policy Area. The upstream-downstream effects of additional Germantown West development on roads in neighboring areas would still need to be determined before a final recommendation of the amount of staging ceiling that could be allocated.

While these four categories of improvements could also provide sufficient staging ceiling capacity to allow full development of the Town Center, in order to meet current LATR standards, all of the previously identified roadway and intersection improvements would also have to be provided.

C. Discussion of Future Development Implications

1. Germantown West Road Club - The Germantown West Road Club development can be approved, while the Germantown West remains a Group II area and the Town Center is given priority in development, only if a large number of additional road projects are built. With some additional infrastructure improvements, and Germantown West as a Group III area, enough staging ceiling capacity would be created which could be allocated to some of the queue of pending development and/or the properly zoned Road Club properties. Local Area Review would still need to be met.
2. Germantown West Queue of Pending Development - Development pending in the Queue may be allocated staging ceiling capacity if the road improvements necessary for the Town Center are programmed and Germantown West becomes a Group III area. It is important to stage additional residential and commercial development in step to optimize the use of infrastructure and the implementation of a Transportation Management District. Constructing residences at the same general time as a large increase in employment occurs would result in shorter than usual travel times for work trips.

D. Coordination with Other Agencies

Many meetings have been held to discuss the scope of this analysis as well as the content of this work. Outside this department, staff established a technical advisory group with representatives from OPP, MCDOT, and the developers of the Germantown Town Center and other Germantown West properties to review the analysis approach that was used. Staff has met with that group three times during the course of the analysis. The MCPD's Transportation Modeling Technical Advisory Committee has been kept apprised of the technical modeling analysis methods.

In addition, staff has had a number of separate meetings with the Office of Planning Policies to coordinate the analysis with the work they are doing on the development of a funding approach to pay for the transportation improvements necessary to permit the development of the Germantown Town Center. Staff has also briefed the Germantown Town Center Advisory Group on the scope, progress, and results the study.

IV. TECHNICAL APPENDIX

A. Transportation Analysis Procedure Used in the Germantown Town Center Transportation Staging Analysis

The System for Local Area Traffic Estimation (SLATE) developed by Planning Department staff, has a number of components. These include analytic structure and data, theory, calibration, and application.

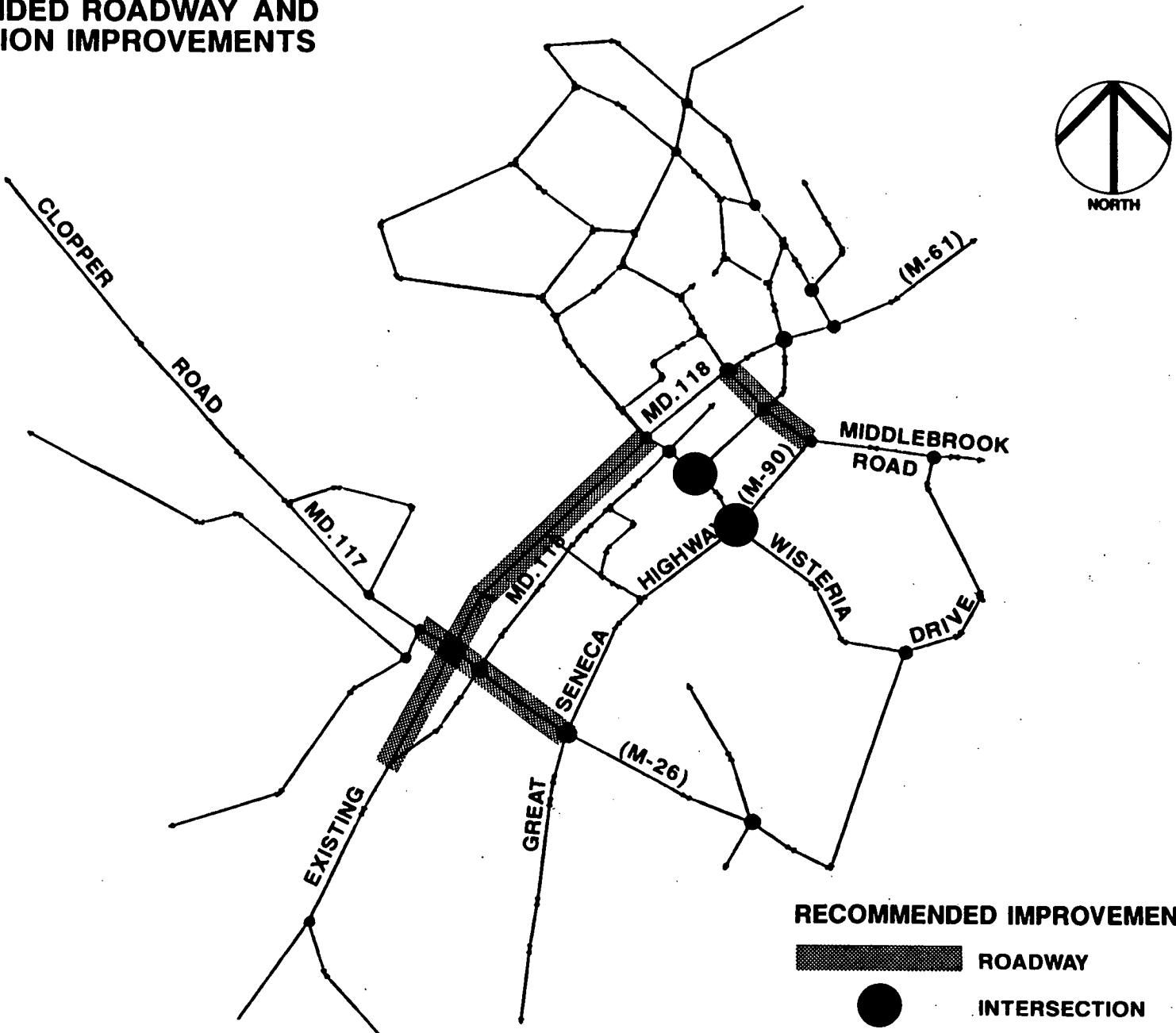
1. Analytic Structure and Data

Data on housing and employment uses was provided by the Community Planning Division at the subzone level. For commercial uses, this data is classified by square footage and type of use, while for residential development, this data is by type of dwelling unit, in keeping with the categories used in Trip Generation for LATR. The roadway networks have been detailed for the various analysis time frames (see MAP 10). All significant intersections in the Germantown West area are described by the number of turning lanes on each approach.

TABLE 3: COMPARISON OF TRAFFIC ZONE SYSTEMS

ZONES	SLATE	TRAVEL 2
TOTAL	67	651
GERMANTOWN WEST	45	12
TOWN CENTER	12	3
EXTERNAL STATIONS	10	13

The SLATE analysis has greater geographic specificity within the area under study than does the regional TRAVEL 2 model. The zone structure elements are shown in the preceding table and drawn on MAP 1 of the report. Also shown are external stations, which represent entry or exit points to the study area. MAP 2 shows the location of Germantown West and the Germantown Town Center in the context of Montgomery County. The study area for this analysis is all of Germantown West, while for the TRAVEL 2 model system, the study area is all of metropolitan Baltimore and Washington. The methodology for SLATE is a hybrid of LATR and regional modeling.

RECOMMENDED ROADWAY AND
INTERSECTION IMPROVEMENTS

2. Theory

Transportation planning models can be conceived of as having several analytical steps including: trip generation, trip distribution, including choice of destination, mode, and time of departure, the route assignment of trips, and intersection control.

- a. Trip Generation. Trip generation rates are being applied to an aggregation of land parcels (or traffic zones) throughout the study area. The PM peak-hour vehicle trip rates developed from the M-NCPPC Trip Generation Study were used for all trip ends inside the study area. As is standard practice, each trip (or trip interchange) has been defined as having two trip ends. Trip generation occurs at both the origin and destination ends of a trip. Trip ends are linked together in the next stage of the model to form trips. The number of trips from outside the study area to inside (and inside to outside) is estimated using TRAVEL 2 PM peak-period trip rates multiplied by the proportion of those trips using auto mode and the likelihood of that peak-period trip occurring in the peak hour. The total number of trip ends is controlled by the higher of either origin or destination trip ends for this analysis. This means, for instance, that if the total number of origins is less than the total number of destinations, the number of origin trip ends is increased uniformly to match the number of destination trip ends.

While in the TRAVEL 2 model, trip purpose is necessary to determine the trip length distribution, in LATR, no trip purpose is ascribed. Trips of different purposes have different length distributions, for example, the mean travel time for a work to home trip is 23 minutes, while that for a home to shop trip is 7 minutes. By using the composite distribution from the regional model, as discussed in the next paragraph, this problem is overcome in the SLATE analysis procedure.

- b. Destination Choice. The spatial distribution of trips, or choice of destinations, is derived from the TRAVEL 2 peak hour vehicle trip table. That is used as a composite "gravity" matrix on which the origin and destination trip ends are balanced. Balancing guarantees that trip ends are matched in the pattern most resembling base year conditions. The term "gravity" model is used to describe the means in which trip distribution is performed in regional transportation planning models and is more fully discussed in the TRAVEL 2 documentation. Through trips, local trips, and internal-external trips are balanced on a single "gravity"

matrix. The regional trip table is disaggregated to the subzones in the study area proportionately for its use as a "gravity" matrix. Performing an explicit trip distribution permits the computation of "discounting" rates as used by LATR for determining for what distance trips need to be considered on the road network.

- c. Mode Choice. Mode choice is implicit in the vehicle trip rates estimated for local area transportation review. For sites within 2500 feet of high service transit stations, different trip rates are used. That is consistent with Local Area Transportation Review guidelines for areas around Metrorail stations. Mode Choice is modeled in TRAVEL 2, and the resultant external station volumes are consistent with the model's estimate of mode choice.
- d. Departure Time Choice. LATR trip rates are explicitly peak hour trip generation rates and thus no assumption for congestion induced peak spreading is made. In the TRAVEL 2 model, Departure Time Choice is modeled, and thus the volumes at the external stations are consistent with the TRAVEL 2 estimates of peak spreading.
- e. Route Assignment. Trips are assigned to particular travel routes using the same procedures as in the TRAVEL 2 model. All trips leaving the study area go to one of the external stations. During each iteration of the auto assignment, intersection delay is updated. Thus the assignment is in equilibrium for links and respects intersection control.
- f. Intersection Control. Intersection delay is estimated using the traffic volume on each approach, and the turning lanes on each approach. A technique similar to the Highway Capacity Manual delay method is used, although the actual equations are different. The delay is used only to better estimate traffic volumes in the route assignment process and is not used as a measure of transportation level of service. Separate estimates of level of service are made from the results of the assignment of traffic to routes.

3. Calibration

The model was calibrated to base year conditions for intersection and road volumes. This does not mean it will necessarily identically replicate on-ground conditions, but that the inaccuracy in the base year is known and used for interpretation of model results. The main source of traffic counts data was from Montgomery County Department of Transportation and from

several of the traffic studies performed in the last two years for projects including Marriott/Milestone and Manekin-Cloverleaf.

4. Application

In application, the baseline for comparison is the "base + pipeline", or the total of on ground development and the pipeline of approved development. The networks assumed are from the first four years of the Capital Improvements Program, including approved developer funded roads. The SLATE model results for the area-wide average congestion index are comparable with results from the TRAVEL 2 model used in the FY93 Annual Growth Policy analysis work.

B. Travel Characteristics of the Germantown Area

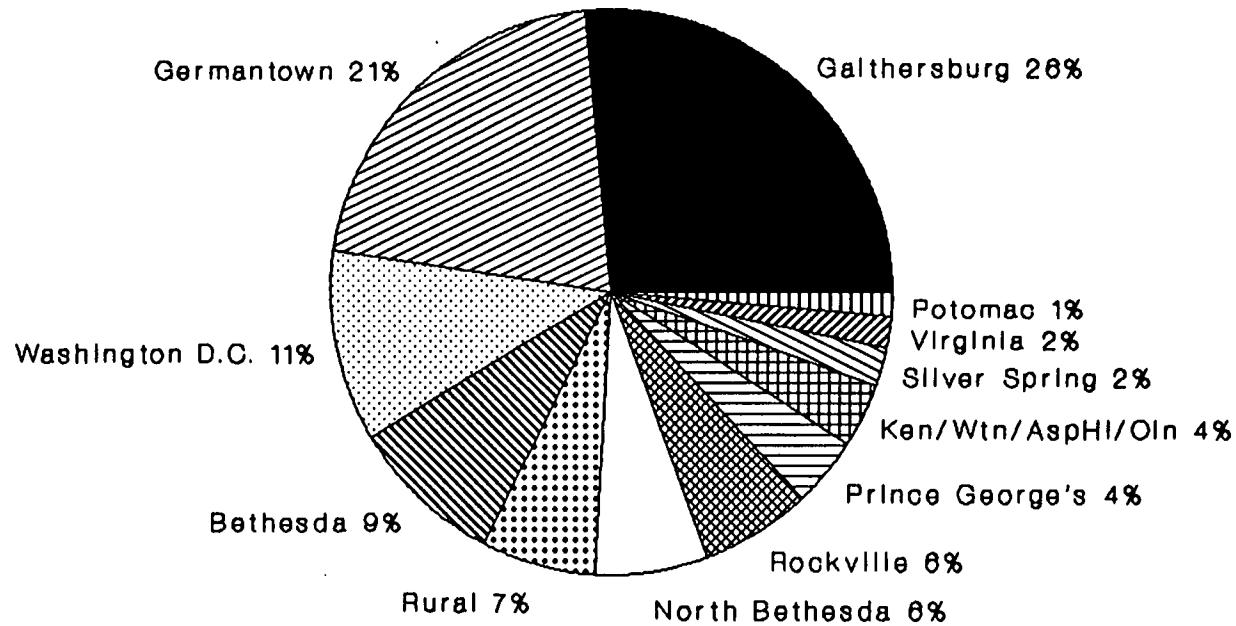
As part of the Town Center Staging Analysis, staff studied the travel characteristics of Germantown residents and workers. Two primary measures were reviewed: the spatial distribution for work trips and the choice of mode for work trips. This data is drawn from the Metropolitan Washington Council of Governments Household Survey, conducted in 1987/88. Information about travel behavior and demographics was collected, including characteristics on over 50,000 trips in the metropolitan area. This survey was a key resource used in developing the TRAVEL 2 model.

FIGURE 2 displays the Work Place of Germantown Residents. Almost half of all workers who live in Germantown work in Germantown or Gaithersburg. The trips are predominantly inbound, as would be indicated by the current location of employment in the region. Thus, almost no Germantown residents work farther out than they live, but a relatively large amount, over 20%, work inside the Beltway. Transportation serving Germantown residents still needs to be geared toward the radial trip. Introduction of additional employment in Germantown, Clarksburg, or Frederick County would obviously change the trip distribution pattern of Germantown residents and workers, but the traditional commute can be expected to remain a large, though declining, share of trips.

FIGURE 3 illustrates the modes used by Germantown residents on their way to work. The automobile is clearly dominant and can be expected to remain dominant without a radical change in behavior. The provision of HOV lanes on I-270 would surely help encourage carpooling, particularly if a time savings were involved either due to congestion or due to exclusive HOV ramps, queue jumpers, or other facilities. The transit share can be expected to improve if additional transit facilities serving Germantown residents are provided, including more MARC service, additional well-placed buses, and better transit access conditions. Mixing of land uses resulting in a balanced job/housing ratio would increase the share of workers able to walk or bike to work. Much is dependent not only on development approval, which has been granted for a large amount of office and retail space, but also on construction of offices in this mostly residential area.

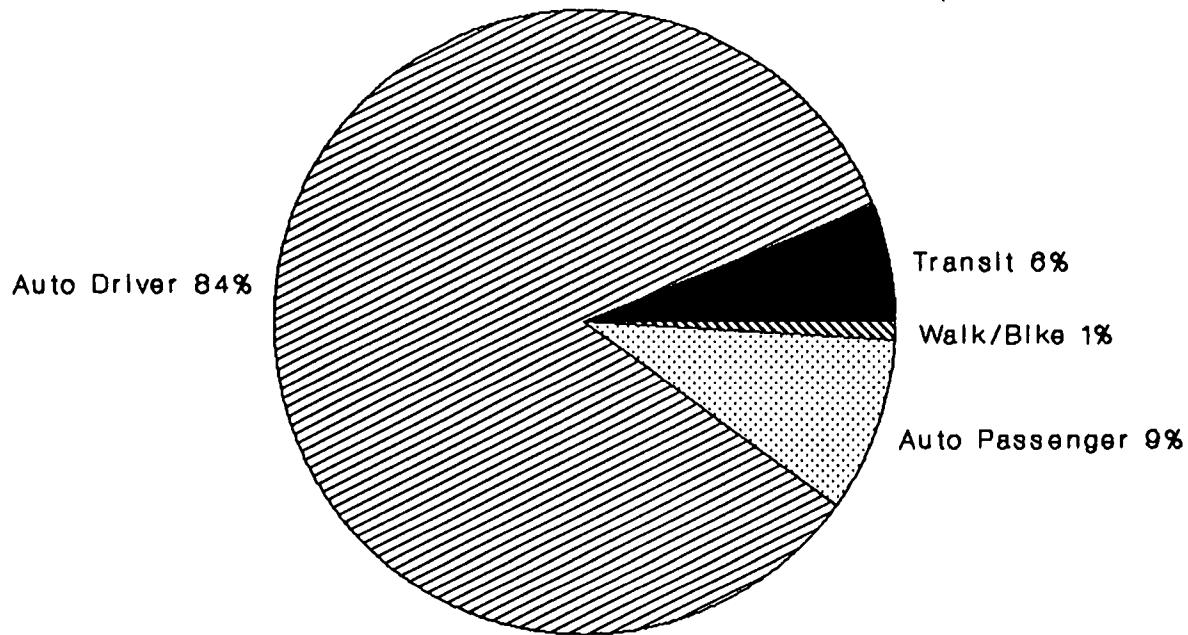
FIGURE 2

Work Place of Germantown Residents



Source: MWCOG Household Survey 1987/88

Work Trip Mode Share Germantown Residents



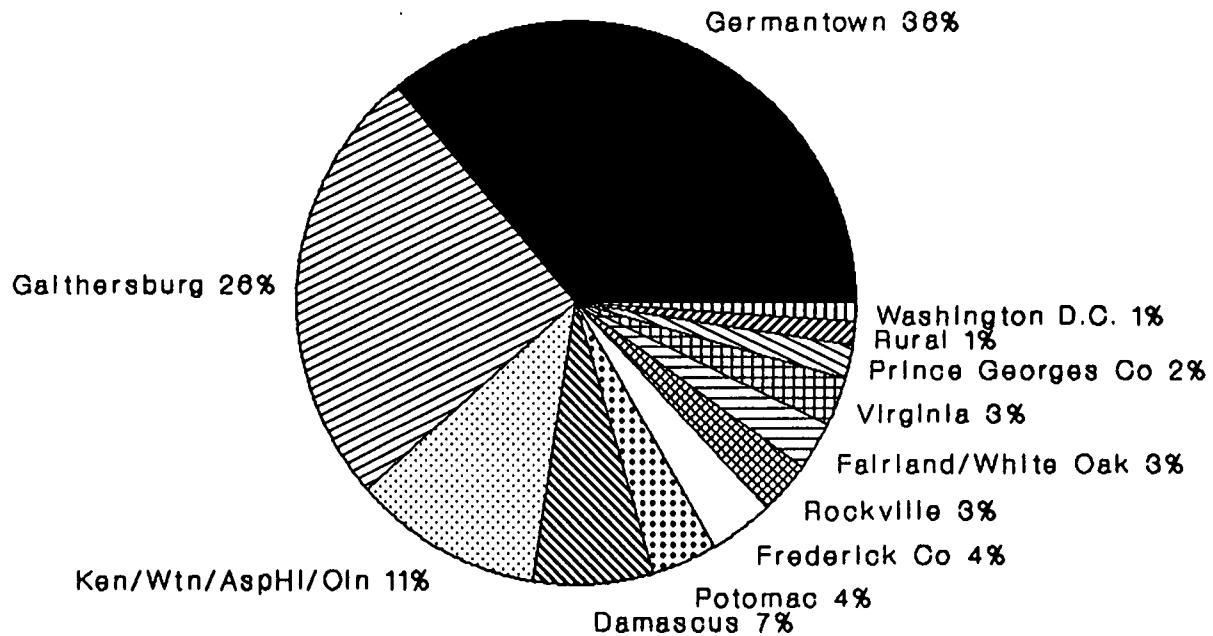
Source: MWCOG Household Survey 1987/88
AM Peak Period

FIGURE 3

FIGURE 4 shows the Place of Residence of People Employed in Germantown. Most people who work in Germantown live either in Germantown or the adjoining corridor city of Gaithersburg. This indicates that most trips are relatively short in distance, and transportation which is related to additional jobs in Germantown needs to be geared to serve these trips. As long as the number of jobs in the Germantown area remains less than the number of workers, it can be expected that persons working in the area will have shorter than average trip lengths and greater flexibility in their commutes. Short, dispersed trips are well suited to the automobile, while longer focused trips can be better served by fixed route transit on exclusive rights of way.

FIGURE 5 depicts the mode share of persons who work in Germantown. The number of workers who take transit or walk or bike to work is currently very small, and thus does not appear in the sample. Close to 40% of the trips could be classified as share-a-ride. With conventional transit routing and current land use patterns upstream of Germantown, the transit share will remain small. Clustered development around transit stations that feed the Germantown Employment Corridor and Town Center, such as proposed in the Clarksburg Master Plan, will certainly increase the transit mode share. Due to the excessive congestion on I-270 north of Germantown, provision of HOV facilities along with coordinated Transportation Demand Management measures could further increase the high proportion of share-a-ride trips. An analogous area is found in the Shirley Highway corridor of Prince William and Fairfax Counties in Virginia.

Place of Residence of People Employed in Germantown

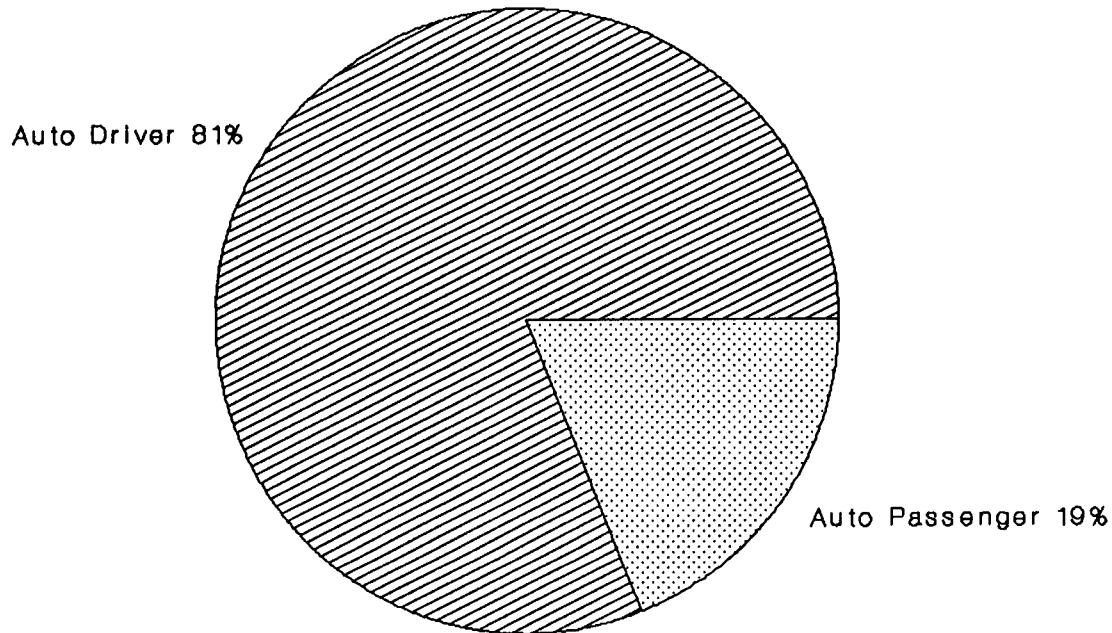


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Source: MWCOG Household Survey 1987/88

FIGURE 4

Work Trip Mode Share Germantown Workers



MWCOG Household Survey 1987/1988
AM Peak Period

TABLE 4: SUMMARY OF HOUSING UNITS AND JOBS IN THE BASE, PIPELINE, AND QUEUE

Newer Traffic Zone	Housing Units					Jobs				
	Existing or Base		Base plus Pipeline	Base Queue	Base, Pipe. & Queue	Existing or Base		Base plus Pipeline	Base Queue	Base, Pipe. & Queue
	A	B	C = A+B	D	E = C+D	F	G	H = F+G	I	J = H+I
C7	248	0	0	0	0	2,478	1,988	4,466	0	4,466
	249	0	0	0	0	2,776	4,844	7,620	0	7,620
	250	0	881	881	0	881	0	2,701	2,701	2,362
	251	4,455	763	5,218	81	5,299	119	253	372	5
	252	588	1,186	1,774	672	2,446	55	205	260	2,232
	253	56	0	56	2020	2,076	5	5	10	0
	254	4,905	43	4,948	0	4,948	463	321	784	83
	255	1,796	83	1,879	775	2,654	380	0	380	0
	256	1,753	0	1,753	1798	3,551	5	32	37	482
	German. West	13,553	2,956	16,509	5,346	21,855	6,281	10,350	16,631	5,164
C8	282	0	0	0	0	0	155	231	386	509
	283	0	102	102	28	130	1,226	639	1,866	102
	284	0	0	0	0	0	741	1,938	2,679	151
	Town Center	0	102	102	28	130	2,122	2,809	4,931	762
Total		13,553	3,058	16,611	5,374	21,985	8,404	13,158	21,562	5,926
										27,488

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Montgomery County Planning Department Management

Robert M. Marriott, Jr., Planning Director
Charles Loehr, Deputy Planning Director
Robert M. Winick, Chief, Transportation Planning Division

Project Staff

Bud Liem, Transportation Coordinator
Michael Replogle, Transportation Coordinator
John Matthias, Transportation Coordinator
David M. Levinson, Transportation Planner
Ed Axler, Transportation Planner
Ki H. Kim, Transportation Planner
Ivy Leung, Planner
Margaret Kaii, Planner

Technical Staff

Faye Smith, Drafting Technician
Donna Jackson, Drafting Technician

Contributing Planning Department Divisions

Community Planning
Transportation Planning
Urban Design - Mapping and Graphics/CADD/GIS
Administrative Services

